INDEX

Fishery Bulletin Vol. 72, No. 1-4, 1974

Abalone
southern California, temperature influence
Haliotis corrugata 1137
Haliotis fulgens 1137
Haliotis rufescens 1137

"Ability of male king crab, *Paralithodes camtschatica*, to mate repeatedly, Kodiak, Alaska, 1973," by Guy C. Powell, Kenneth E. James, and Charles L. Hurd 171

Abudefduf abdominalis
feeding relationships on coral reefs in Kona, Hawaii 980

Abudefduf imparipennis
feeding relationships on coral reefs in Kona, Hawaii 980

Abudefduf sindonis
feeding relationships on coral reefs in Kona, Hawaii 979

Abudefduf sordidus
feeding relationships on coral reefs in Kona, Hawaii 979

"Abundance of pelagic fish during the 19th and 20th centuries as recorded in anaerobic sediment off the Californias," by Andrew Soutar and John D. Isaacs 257

Acanthurus thompsoni
feeding relationships on coral reefs in Kona, Hawaii 1000

"Acoustic telemetry from fish," by John Kanwisher, Kenneth Lawson, and Gunnar Sundness 251

Acoustic telemetry—see Telemetry

ADRON, J. W., A. BLAIR, and C. B. COWEY, "Rearing of plaice (*Pleuronectes platessa*) larvae to metamorphosis using an artificial diet" 353

Aetideus
calanoid copepod from Gulf of Mexico
Aetideus acutus Farran 217
Aetideus giesbrechti Cleve 220
Aetideus mexicanus, new species 215

"(The) age composition of striped bass catches in Virginia rivers, 1967-1971, and a description of the fishery," by George C. Grant 193

AHLSTROM, ELBERT H.—see MOSER and AHLSTROM

Aholehole
feeding relationships on coral reefs in Kona, Hawaii
Kuhlia sandvicensis 948

Alaminos—see Vessels

Alaska
Kodiak 171

Alaska—see Vessels

Albatross—see Vessels

Albatross IV—see Vessels

Allelochemics
marine, and evolution 1

ALVARINO, ANGELES, "Distribution of siphonophores in the regions adjacent to the Suez and Panama canals" 527

"American lobsters tagged by Maine commercial fishermen, 1957-59," by Robert L. Dow 622

"Analysis of migrations and mortality of bluefin tuna, *Thunnus thynnus*, tagged in the northwestern Atlantic Ocean," by F. J. Mather III, B. J. Rothschild, G. J. Paulik, and W. H. Lenarz 900

Anampses cuvier
feeding relationships on coral reefs in Kona, Hawaii 992

ANAS, RAYMOND E., "Heavy metals in the northern fur seal, *Callorhinus ursinus*, and harbor seal, *Phoca vitulina richardi*" 133

Anchovy
swimming energetics of larval 885

Ancylopsetta quadrocellata—see Flounder, ocellated

Angelfish
feeding relationships on coral reefs in Kona, Hawaii
angelfish 964
potter's angelfish 964

Aphareus furcatus
feeding relationships on coral reefs in Kona, Hawaii 955

Apogon erythrinus
feeding relationships on coral reefs in Kona, Hawaii 950

Apogon menesemus
feeding relationships on coral reefs in Kona, Hawaii 951

Apogon snyderi
feeding relationships on coral reefs in Kona, Hawaii 951

APRIETO, VIRGINIA L., "Early development of five carangid fishes of the Gulf of Mexico and the south Atlantic coast of the United States" .. 415

Arcturus—see Vessels

Argo—see Vessels

Argosy—see Vessels

Arothron hispidus
feeding relationships on coral reefs in Kona, Hawaii 1012

Arothron meleagris
feeding relationships on coral reefs in Kona, Hawaii 1012

Arrow—see Vessels

Artificial structures
evaluation of mid-water for attracting fishes
behavior observations at structures 188
behavioral mechanisms 189
comparison of day and night collections 187
diver estimates of numbers and species 184
purse seine operations 190
recruitment patterns and production 186
responses to moving structures 188
size and color evaluation 187

Askoy—see Vessels

Atlantic Ocean
zoogeography of the genus *Nematoscelis* 1039

Atlantis—see Vessels

Atlantis II—see Vessels

Aulostomus chinensis
feeding relationships on coral reefs in Kona, Hawaii 942

Auxis sp.—see Mackerel, frigate

BAKKALA, RICHARD G.—see FRENCH and BAKKALA

BAKUN, ANDREW, DOUGLAS R. MCLAIN, and FRANK V. MAYO, "The mean annual cycle of coastal upwelling off western North America as observed from surface measurements" 843

BALDRIDGE, ALAN, "Migrant gray whales with calves and sexual behavior of gray whales in the Monterey area of central California, 1967-73" .. 615

Balloonfish
feeding relationships on coral reefs in Kona, Hawaii
Arothron hispidus 1012
Arothron meleagris 1012

Bass, sea—see Sea bass

Bass, striped
age composition and fishery in Virginia rivers
cycles of abundance 197
description of fishery 193
differences in age composition between years and rivers 196
seasonal age composition 195
seasonal and annual age composition of river catches 197

BEITINGER, THOMAS L., "Thermoregulatory behavior and diel activity patterns of bluegill, *Lepomis macrochirus*, following thermal shock" 1087

BEJDA, ALLEN J.—see OLLA et al.

BELL, FREDERICK W.—see FULLENBAUM and BELL

BEN-YAMI, M., and T. GLASER, "The invasion of *Saurida undosquamis* (Richardson) into the Levant Basin - an example of biological effect of interoceanic canals" 359

BENIGNO, JOSEPH A.—see KEMMERER et al.

Bigeye
feeding relationships on coral reefs in Kona, Hawaii 948

"Bioeconomic contribution of Columbia River hatchery coho salmon, 1965 and 1966 broods, to the Pacific salmon fisheries," by Roy J. Wahle, Robert R. Vreeland, and Robert H. Lander 139

BLAIR, A.—see ADRON et al.

Blake—see Vessels

Blue Goose—see Vessels

Bluegill
thermoregulatory behavior and diel activity patterns following thermal shock 1087

Bodianus bilunulatus
feeding relationships on coral reefs in Kona, Hawaii 989

Boreogadus saida—see Cod, Arctic

Bothus mancus
feeding relationships on coral reefs in Kona, Hawaii 1005

"*Bothus thompsoni* (Fowler) 1923, a valid species of flatfish (Pisces: Bothidae) from the Hawaiian Islands," by Paul Struhsaker and Robert M. Moncrief 237

Bothus thompsoni
a valid species of flatfish
comparison with other species of *Bothus* ... 243
description ... 237
ecology ... 245
material examined ... 245

George M. Bowers—see Vessels

BOWMAN, THOMAS E.—see WILLIAMS et al.

Boxfish
feeding relationships on coral reefs in Kona, Hawaii
Ostracion meleagris ... 1011

Brevoortia patronus—see Menhaden, Gulf

BROOKS, A. L., C. L. BROWN, JR., and P. H. SCULLY-POWER, "Net filtering efficiency of a 3-meter Isaacs-Kidd Midwater Trawl" ... 618

Brotula
feeding relationships on coral reefs in Kona, Hawaii
Brotula multibarbata ... 930

Brotula multibarbata
feeding relationships on coral reefs in Kona, Hawaii ... 930

BROWN, C. L., JR.—see BROOKS et al.

Anton Bruun—see Vessels

Butterflyfish
feeding relationships on coral reefs in Kona, Hawaii
blackface ... 969
blue-striped ... 975
Chaetodon auriga ... 975
Chaetodon corallicola ... 969
Chaetodon miliaris ... 969
Forciper longirostris ... 965
Forcipiger flavissimus ... 965
four-spot ... 971
Hemitaurichthys thompsoni ... 967
masked ... 976
one-spot ... 972
ornated ... 973
pebbled ... 972

CABLE, WAYNE D., and WARREN S. LANDERS, "Development of eggs and embryos of the surf clam, *Spisula solidissima*, in synthetic seawater" ... 247

"Calanoid copepods of the genus *Aetideus* from the Gulf of Mexico," by Taisoo Park ... 215

California
Del Mar ... 670
La Jolla ... 295

Callorhinus ursinus—see Seal, fur

Calypso—see Vessels

Cameron—see Vessels

Canals
interoceanic
example of biological effect of ... 359

Cancer antennarius—see Crab, rock

Cantherines dumerili
feeding relationships on coral reefs in Kona, Hawaii ... 1009

Cantherines sandwichiensis
feeding relationships on coral reefs in Kona, Hawaii ... 1009

Canthigaster amboinensis
feeding relationships on coral reefs in Kona, Hawaii ... 1013

Canthigaster jactator
feeding relationships on coral reefs in Kona, Hawaii ... 1014

Cape St. Mary—see Vessels

Carangidae
distinguishing features
banded rudderfish ... 422
leatherjacket ... 435
lookdown ... 431
rainbow runner ... 419
round scad ... 427
distribution and spawning
banded rudderfish ... 426
leatherjacket ... 439
lookdown ... 435
rainbow runner ... 421
round scad ... 429
fin development
banded rudderfish ... 426
leatherjacket ... 438
lookdown ... 434
rainbow runner ... 420
round scad ... 429
literature
banded rudderfish ... 422
leatherjacket ... 435
lookdown ... 431
rainbow runner ... 417
round scad ... 426
morphology
banded rudderfish ... 422
leatherjacket ... 435
lookdown ... 431
rainbow runner ... 419
round scad ... 427
pigmentation
banded rudderfish ... 423
leatherjacket ... 438
lookdown ... 433
rainbow runner ... 420
round scad ... 427

Caranx mate—see Omaka

Caranx melampygus—see Ulua, blue

Cardinalfish
feeding relationships on coral reefs in Kona, Hawaii
Apogon erythrinus 950
Apogon menesemus 951
Apogon snyderi 951

CASTAGNA, M.—see KENNEDY et al.

Centropyge potteri
feeding relationships on coral reefs in Kona, Hawaii 964

Cephalopholis argus
feeding relationships on coral reefs in Kona, Hawaii 947

Chaetodon auriga
feeding relationships on coral reefs in Kona, Hawaii 975

Chaetodon corallicola
feeding relationships on coral reefs in Kona, Hawaii 969

Chaetodon fremblii
feeding relationships on coral reefs in Kona, Hawaii 975

Chaetodon lunula
feeding relationships on coral reefs in Kona, Hawaii 976

Chaetodon miliaris
feeding relationships on coral reefs in Kona, Hawaii 969

Chaetodon multicinctus
feeding relationships on coral reefs in Kona, Hawaii 972

Chaetodon ornatissimus
feeding relationships on coral reefs in Kona, Hawaii 973

Chaetodon quadrimaculatus
feeding relationships on coral reefs in Kona, Hawaii 971

Chaetodon unimaculatus
feeding relationships on coral reefs in Kona, Hawaii 972

Chain—see Vessels

"Changes in the amount and proportions of DDT and its metabolites, DDE and DDD, in the marine environment off southern California, 1949-72," by John S. MacGregor 275

Cheilinus rhodochrous
feeding relationships on coral reefs in Kona, Hawaii 989

"Chemical signals in the sea: marine allelochemics and evolution," by J. S. Kittredge, Francis T. Takahashi, James Lindsey, and Reuben Lasker 1

Chemical signals
in the sea
allelochemics 1
marine kairomones 4
pheromones 5

Chromis leucurus
feeding relationships on coral reefs in Kona, Hawaii 982

Chromis ovalis
feeding relationships on coral reefs in Kona, Hawaii 984

Chromis vanderbilti
feeding relationships on coral reefs in Kona, Hawaii 982

Chromis verater
feeding relationships on coral reefs in Kona, Hawaii 984

Chub, sea—see Sea chub

Cirrhitops fasciatus
feeding relationships on coral reefs in Kona, Hawaii 988

Cirrhitus pinnulatus
feeding relationships on coral reefs in Kona, Hawaii 988

Cirripectus variolosus
feeding relationships on coral reefs in Kona, Hawaii 999

Citharichthys spilopterus—see Whiff, bay

Clam, hard
temperature-time relationships for survival of embryos and larvae 1160

Clam, soft-shell
reproductive cycle at Skagit Bay, Washington
description of area 648
females 649
immature 652
males 649
1971 reproductive cycle 652
1972 reproductive cycle 654

Clam, surf
eggs and embryos
development of, in synthetic seawater 247

CLARKE, THOMAS A., "Some aspects of the ecology of stomiatoid fishes in the Pacific Ocean near Hawaii" 337

CLARKE, WILLIAM D.—see ROSENTHAL et al.

Coastal upwelling
off western North America
mean annual cycle as observed from surface measurements 843

John N. Cobb—see Vessels

Cod, Arctic
density distribution of juveniles in Chukchi Sea
horizontal density distribution 1101
possible causes of density structure and its vertical displacement 1099

Cololabis saira—see Saury, Pacific

Combat—see Vessels

Combtooth blennies
feeding relationships on coral reefs in Kona, Hawaii
Cirripectus variolosus 999
Exallias brevis 998
sabre-toothed 999

Conger marginatus
feeding relationships on coral reefs in Kona, Hawaii 929

Coquette—see Vessels

Coris gaimard
feeding relationships on coral reefs in Kona, Hawaii 993

Cornetfish
feeding relationships on coral reefs in Kona, Hawaii
Fistularia petimba 944

COWEY, C. B.—see ADRON et al.

Crab, king
ability of male to mate repeatedly near Kodiak, Alaska 171
distribution and relative abundance of larvae in southeastern Bering Sea, 1969-70
distribution 810
larval release areas 811
relation between distribution of larvae and current patterns 812
relative abundance 810

Crab, rock
laboratory study of behavioral interactions with the California spiny lobster 1146

Crabs
swimming, of genus *Callinectes*
Callinectes arcuatus 752
Callinectes bellicosus 761
Callinectes bocourti 766
Callinectes danae 746
Callinectes exasperatus 757
Callinectes gladiator 735
Callinectes latimanus 775
Callinectes maracaiboensis 773
Callinectes marginatus 722
Callinectes ornatus 739
Callinectes rathbunae 772
Callinectes sapidus 778
Callinectes similis 731
Callinectes toxotes 764
characters of systematic value 687
fossil record 715
genus *Callinectes* 719
history 685
key to species of *Callinectes* 720
larval development 713
key to species of *Callinectes* 720
larval development 713
measurements 689
modern distribution 717
questionable species 791

CRAWFORD, L., D. W. PETERSON, M. J. KRETSCH, A. L. LILYBLADE, and H. S. OLCOTT, "The effects of dietary α-tocopherol and tuna, safflower, and linseed oils on the flavor of turkey" 1032

Croaker, Atlantic
electrical threshold response of 851

Townsend Cromwell—see Vessels

CUSHING, D. H., "A link between science and management in fisheries" 859

"Daily activity, movements, feeding, and seasonal occurrence in the tautog, *Tautoga onitis*," by Bori L. Olla, Allen J. Bejda, and A. Dale Martin 27

DAMKAER, DAVID M.—see WILLIAMS et al.

Damselfish
feeding relationships on coral reefs in Kona, Hawaii
Abudefduf abdominalis 980
Abudefduf imparipennis 980
Abudefduf sindonis 979
Abudefduf sordidus 979
Chromis leucurus 982
Chromis ovalis 984
Chromis vanderbilti 982
Chromis verater 984
Dascyllus albisella 982
Plectroglyphidodon johnstonianus 978
Pomacentrus jenkinsi 979

Dascyllus albisella
feeding relationships on coral reefs in Kona, Hawaii 982

DAYTON, PAUL K.—see ROSENTHAL et al.

DDT
changes in amount and proportions of, and its metabolites in marine environment off southern California, 1949-72 275

Decapterus punctatus—see Scad, round

Delaware—see Vessels

Del Mar, California 670

"Density distribution of juvenile Arctic cod, *Boreogadus saida*, in the eastern Chukchi Sea in the fall of 1970," by Jay C. Quast 1094

"Description of eggs and larvae of scaled sardine, *Harengula jaguana*," by Edward D. Houde, William J. Richards, and Vishnu P. Saksena 1106

"Development and distribution of larvae and juveniles of *Sebastolobus* (Pisces; Family Scorpaenidae)," by H. Geoffrey Moser 865

"Development of eggs and embryos of the surf clam, *Spisula solidissima*, in synthetic seawater," by Wayne D. Cable and Warren S. Landers 247

"Development of eggs and larvae of *Caranx mate* (Carangidae)," by John M. Miller and Barbara Y. Sumida 497

Diamantina—see Vessels

Diodon holocanthus
feeding relationships on coral reefs in Kona, Hawaii 1015

Diodon hystrix
feeding relationships on coral reefs in Kona, Hawaii 1015

Discovery—see Vessels

"Distribution and relative abundance of larvae of king crab, *Paralithodes camtschatica*, in the southeastern Bering Sea, 1960-70," by Evan B. Haynes 804

"Distribution of siphonophores in the regions adjacent to the Suez and Panama canals," by Angeles Alvarino 527

Distribution, variation, and supplemental description of the opossum shrimp, *Neomysis americana* (Crustacea: Mysidacea)," by Austin B. Williams, Thomas E. Bowman, and David M. Damkaer 835

Dolphin—see Vessels

Dorsetshire—see Vessels

DOW, ROBERT L., "American lobsters tagged by Maine commercial fishermen, 1957-59" 622

DURKIN, JOSEPH T., and DAVID A. MISITANO, "Occurrence of a ratfish in the Columbia River estuary" 854

"Early development of five carangid fishes of the Gulf of Mexico and the south Atlantic coast of the United States," by Virginia L. Aprieto 415

Echidna zebra
feeding relationships on coral reefs in Kona, Hawaii 928

"Ecology and natural history of a stand of giant kelp, *Macrocystis pyrifera*, off Del Mar, California," by Richard J. Rosenthal, William D. Clarke, and Paul K. Dayton 670

Ecosystems—see Marine ecosystems

Eel
feeding relationships on coral reefs in Kona, Hawaii
broad-banded moray 928
Gymnothorax eurostus 927
Gymnothorax flavimarginata 927
spotted moray 926
white 929
zebra moray 928

"(The) effects of dietary α-tocopherol and tuna, safflower, and linseed oils on the flavor of turkey," by L. Crawford, D. W. Peterson, M. J. Kretsch, A. L. Lilyblade, and H. S. Olcott 1032

"Effects of oil on marine ecosystems: a review for administrators and policy makers," by Dale R. Evans and Stanley D. Rice 625

"Egg and larval development of the Atlantic thread herring, *Opisthonema oglinum*," by William J. Richards, Robert Victor Miller, and Edward D. Houde 1123

Elagatis bipinnulata—see Runner, rainbow

"Electrical threshold response of some Gulf of Mexico fishes," by Edward F. Klima 851

"Electrophoretic comparison of five species of pandalid shrimp from the northeastern Pacific Ocean," by Allyn G. Johnson, Fred M. Utter, and Harold O. Hodgins 799

Embryos
hard clam
temperature-time relationships for survival 1160

Emilia—see Vessels

Engraulis mordax—see Anchovy

Ensign—see Vessels

Eschrichtius robustus—see Whale, gray

Etropus crossotus—see Flounder, fringed

Euthynnus alletteratus—see Tuna, little tunny

"(An) evaluation of mid-water artificial structures for attracting coastal pelagic fishes," by Donald A. Wickham and Gary M. Russell 181

EVANS, DALE R., and STANLEY D. RICE, "Effects of oil on marine ecosystems: a review for administrators and policy makers" 625

Evolution
and marine allelochemics 1

Exallias brevis
feeding relationships on coral reefs in Kona, Hawaii 998

"(An) examination of the yield per recruit basis for a minimum size regulation for Atlantic yellowfin tuna, *Thunnus albacares*," by W. H. Lenarz, W. W. Fox, Jr., G. T. Sakagawa, and B. J. Rothschild 37

FAHAY, MICHAEL P., "Occurrence of silver hake, *Merluccius bilinearis*, eggs and larvae along the middle Atlantic continental shelf during 1966" 813

"Feeding relationships of teleostean fishes on coral reefs in Kona, Hawaii," by Edmund S. Hobson 915

Filefish
feeding relationships on coral reefs in Kona, Hawaii
Cantherines dumerili 1009
Cantherines sandwichiensis 1009
Pervagor spilosoma 1010

Fish
abundance of pelagic during 19th and 20th centuries off the Californias 257
electrical threshold response of some Gulf of Mexico
Atlantic croaker 851
chub mackerel 851
longspine porgy 851
scaled sardine 851
spot 851
feeding relationships of teleosts on coral reefs in Kona, Hawaii
aholehole 948
angelfish 964
assessing nocturnal colorations 917
balloonfish 1012
bigeye 948
boxfish 1011
brotulas 930
butterflyfish 964
cardinalfish 950
combtooth blennies 998
conger eel 929
coral reefs as a habitat 1017
cornetfish 944
damselfish 978
filefish 1009
fishes observed on transect lines 923
food habits 916
generalized carnivores: main line of evolution 1018
goatfish 957
hawkfish 986
inshore habitats and their characteristic fishes 918
jacks 954
left-hand flounder 1005
lizardfish 929
moorish idol 1003
moray eel 926
parrotfish 995
porgy 956
scorpionfish 944
sea bass 947
sea chubs 964
sharpbacked puffer 1013
silversides 931
snapper 955
specialized offshoots from the main line of evolution 1022
spiny puffer 1015
squirrelfish 932
surgeonfish 1000
transect counts for habitat categories 917
triggerfish 1005
trumpetfish 942
wrasse 989

Fish harvesting systems
experiments with coastal pelagic fishes to establish design criteria for electrical
captured fish 660
description of test equipment 658
mid-water trawling mode 667
netless fish harvesting mode 664
120-KVA pulse generator design 664
test procedure 658
wild fish 661

Fish Hawk—see Vessels

Fish larvae
and eggs
omaka 497

Fish protein concentrates
composition of residual lipids 845

Fish, stomiatoid
some aspects of ecology near Hawaii
Aristostomias grimialdii 346
Aristostomias lunifer 346
Aristostomias polydactylus 346
Aristostomias tittmanni 346
Astronesthes cyaneus 343
Astronesthes gemmifer 344
Astronesthes indicus 343
Astronesthes lucifer 344
Astronesthes luetkeni 344

Astronesthes splendidus 344
Bathophilus brevis 345
Bathophilus digitatus 345
Bathophilus kingi 345
Bathophilus longipinnis 345
Bathophilus pawneei 345
Chauliodus sloani 342
Danaphos oculatus 342
Diplophos taenia 338
Echiostoma barbatum 345
Eustomias bibulbosus 344
Eustomias bifilis 345
Eustomias gibbsi 345
Flagellostomias boureei 345
Gonostoma atlanticum 340
Gonostoma ebelingi 341
Gonostoma elongatum 341
Heterophotus ophistoma 344
Ichthyococcus ovatus 340
Idiacanthus fasciola 346
Malacosteus niger 346
Margrethia obtusirostra 342
Neonesthes microcephalus 344
Pachystomias microdon 345
Photonectes achirus 345
Photonectes albipennis 345
Photonectes caerulescens 345
Photonectes fimbria 345
Photostomias guernei 346
Stomias danae 343
Thysanactis dentex 345
Valenciennellus tripunctulatus 342
Vinciguerria nimbaria 339
Vinciguerria poweriae 340
Woodsia nonsuchae 342

Fishery management
bioeconomic model: American lobster fishery
demand function for lobsters 19
economic impact of selected management alternatives 21
how the model works 20
production function and supply of lobsters . 16
quadratic example of resource use model .. 14
specification of general resource use model . 13
link between science and
analytic model 860
descriptive model 859
nature of fisheries science 863
science and management in the fishery commissions 862
stock and recruitment 861

Fistularia petimba
feeding relationships on coral reefs in Kona, Hawaii 944

Flatfish—see *Bothus thompsoni*

FLEMINGER, A., and K. HULSEMANN, "Systematics and distribution of the four sibling species comprising the genus *Pontellina* Dana (Copepoda, Calanoida)" 63

Florida
Panama City 181, 657

Flounder
food habits of four species of Georgia 515

Flounder, fringed
Georgia
food habits of 520

Flounder, left-hand
feeding relationships on coral reefs in Kona, Hawaii
Bothus mancus 1005

Flounder, ocellated
Georgia
food habits of 521

"Food habits of Georgia estuarine fishes. I. Four species of flounders (Pleuronectiformes: Bothidae)," by Robert R. Stickney, Gary L. Taylor, and Richard W. Heard III 515

Forcipiger flavissimus
feeding relationships on coral reefs in Kona, Hawaii 965

Forcipiger longirostris
feeding relationships on coral reefs in Kona, Hawaii 965

FORD, RICHARD F.—see KREKORIAN et al.

FOX, W. W., JR.—see LENARZ et al.

Freelance—see Vessels

FRENCH, ROBERT R., and RICHARD G. BAKKALA, "A new model of ocean migrations of Bristol Bay sockeye salmon" 589

Frobisher—see Vessels

FULLENBAUM, RICHARD F., and FREDERICK W. BELL, "A simple bioeconomic fishery management model: a case study of the American lobster fishery" 13

Fundulus diaphanus diaphanus—see Killifish, eastern banded

Gascoyne—see Vessels

Theodore N. Gill—see Vessels

Glacier—see Vessels

GLASER, T.—see BEN-YAMI and GLASER

Goatfish
feeding relationships on coral reefs in Kona, Hawaii
Mulloidichthys auriflamma 957

Mulloidichthys samoensis 957
Parupeneus bifasciatus 960
Parupeneus chryserydros 958
Parupeneus multifasciatus 958
Parupeneus porphyreus 961

Gomphosus varius
feeding relationships on coral reefs in Kona, Hawaii 994

GOPALAKRISHNAN, K., "Zoogeography of the genus *Nematoscelis* (Crustacea, Euphausiacea)" 1039

GRANT, GEORGE C., "The age composition of striped bass catches in Virginia rivers, 1967-1971, and a description of the fishery" 193

Gulf Ranger—see Vessels

Gymnothorax eurostus
feeding relationships on coral reefs in Kona, Hawaii 927

Gymnothorax flavimarginata
feeding relationships on coral reefs in Kona, Hawaii 927

Gymnothorax meleagris
feeding relationships on coral reefs in Kona, Hawaii 926

Gymnothorax petelli
feeding relationships on coral reefs in Kona, Hawaii 928

Hake, red
seasonal distribution of siblings in New England 481

Hake, silver
occurrence of eggs and larvae along middle Atlantic continental shelf during 1966
distribution of eggs 816
distribution of larvae 822

Hake, white
seasonal distribution of siblings in New England 481

Hakes
seasonal distribution of siblings in New England
analysis of temperature and distribution ... 485
distribution with substrate 492
life history stage by sampling strata 484
life history stages 483
natural divisions of study area 483
sampling procedures 482
seasonal distribution 485
temperature 484
topography 483

Halichoeres ornatissimus
feeding relationships on coral reefs in Kona, Hawaii 991

Haliotis corrugata
southern California, temperature influence .. 1137

Haliotis fulgens
southern California, temperature influence .. 1137

Haliotis rufescens
southern California, temperature influence .. 1137

Harengula jaguana—see Sardine, scaled

Harengula pensacolae—see Sardine, scaled

Hassler—see Vessels

Hawaii
feeding relationships of teleostean fishes on coral reefs in Kona, June 1969 to August 1970 915

Hawkfish
feeding relationships on coral reefs in Kona, Hawaii
Cirrhitops fasciatus 988
Cirrhitus pinnulatus 988
Paracirrhites forsteri 986

HAYNES, EVAN B., "Distribution and relative abundance of larvae of king crab, *Paralithodes camtschatica*, in the southeastern Bering Sea, 1969-70" 804

HEARD, RICHARD W. III—see STICKNEY et al.

"Heavy metals in the northern fur seal, *Callorhinus ursinus*, and harbor seal, *Phoca vitulina richardi*," by Raymond E. Anas 133

Hemitaurichthys thompsoni
feeding relationships on coral reefs in Kona, Hawaii 967

Hemitaurichthys zoster
feeding relationships on coral reefs in Kona, Hawaii 969

Herring, Atlantic thread
egg and larval development
branchial development 1134
cephalic development 1131
description of eggs 1124
fin development 1130
morphology of larvae 1125
pigmentation 1135
vertebral development 1127

HIROTA, JED, "Quantitative natural history of *Pleurobrachia bachei* in La Jolla Bight" 295

HOBSON, EDMUND S., "Feeding relationships of teleostean fishes on coral reefs in Kona, Hawaii" 915

HODGINS, HAROLD O.—see JOHNSON et al.

Holacanthus arcuatus
feeding relationships on coral reefs in Kona, Hawaii 964

Holocentrus diadema
feeding relationships on coral reefs in Kona, Hawaii 934

Holocentrus lacteoguttatum
feeding relationships on coral reefs in Kona, Hawaii 937

Holocentrus sammara
feeding relationships on coral reefs in Kona, Hawaii 932

Holocentrus spinifera
feeding relationships on coral reefs in Kona, Hawaii 932

Holocentrus tiere
feeding relationships on coral reefs in Kona, Hawaii 934

Holocentrus xantherythrus
feeding relationships on coral reefs in Kona, Hawaii 934

Holotrachys lima
feeding relationships on coral reefs in Kona, Hawaii 938

Homarus americanus—see Lobster, American

Horizon—see Vessels

HOUDE, EDWARD D.—see RICHARDS et al.

———, WILLIAM J. RICHARDS, and VISHNU P. SAKSENA, "Description of eggs and larvae of scaled sardine, *Harengula jaguana*" 1106

HUGHES, STEVEN E., "Stock composition, growth, mortality, and availability of Pacific saury, *Cololabis saira*, of the northeastern Pacific Ocean" 121

HULSEMANN, K.—see FLEMINGER and HULSEMANN

Hunt—see Vessels

HURD, CHARLES L.—see POWELL et al.

Hydrolagus colliei—see Ratfish

"In situ experiments with coastal pelagic fishes to establish design criteria for electrical fish harvesting systems," by Wilber R. Seidel and Edward F. Klima 657

Indian Ocean
zoogeography of the genus *Nematoscelis* 1039

"(The) influence of temperature on larval and juvenile growth in three species of southern California abalones," by David L. Leighton 1137

"(The) invasion of *Saurida undosquamis* (Richardson) into the Levant Basin - an example of biological effect of interoceanic canals," by M. Ben-Yami and T. Glaser 359

ISAACS, JOHN D.—see SOUTAR and ISAACS

Isaacs-Kidd Midwater Trawl
net filtering efficiency of a 3-meter 618

Islander VI—see Vessels

Jacks
feeding relationships on coral reefs in Kona, Hawaii
blue ulua 954

JAMES, KENNETH E.—see POWELL et al.

JOHNSON, ALLYN G., FRED M. UTTER, and HAROLD O. HODGINS, "Electrophoretic comparison of five species of pandalid shrimp from the northeastern Pacific Ocean" 799

JOHNSON, MARTIN W., "On the dispersal of lobster larvae into the east Pacific barrier (Decapoda, Palinuridea)" 639

David Starr Jordan—see Vessels

Kagoshima Maru—see Vessels

KANWISHER, JOHN, KENNETH LAWSON, and GUNNAR SUNDNES, "Acoustic telemetry from fish" 251

KAPLAN, EUGENE H., J. R. WELKER, and M. GAYLE KRAUS, "Some effects of dredging on populations of macrobenthic organisms" 445

Katsuwonus pelamis—see Tuna, skipjack

Kelp, giant
ecology and natural history of
algal association 672
causes of plant mortality 673
components of the epifauna 677
epibenthic invertebrates 677
germination 675
observations on 672
plant longevity 676
recruitment 675
survivorship 675

KEMMERER, ANDREW J., JOSEPH A. BENIGNO, GLADYS B. REESE, and FREDERICK C. MINKLER, "Summary of selected early results from the ERTS-1 menhaden experiment" 375

KENNEDY, V. S., W. H. ROOSENBURG, M. CASTAGNA, and J. A. MIHURSKY, "*Mercenaria mercenaria* (Mollusca: Bivalvia): temperature-time relationships for survival of embryos and larvae" 1160

Killifish, eastern banded
unusual occurrence in the lower Columbia River 855

Kistna—see Vessels

KITTREDGE, J. S., FRANCIS T. TAKAHASHI, JAMES LINDSEY, and REUBEN LASKER, "Chemical signals in the sea: marine allelochemics and evolution" 1

KLIMA, EDWARD F., "Electrical threshold response of some Gulf of Mexico fishes" 851

_____—see SEIDEL and KLIMA

Kodiak, Alaska 171

Kona, Hawaii
feeding relationships of teleostean fishes on coral reefs, June 1969 to August 1970 915

Kayo Maru—see Vessels

KRAUS, M. GAYLE—see KAPLAN et al.

KREKORIAN, C. O'NEIL, DAVID C. SOMMERVILLE, and RICHARD F. FORD, "Laboratory study of behavioral interactions between the American lobster, *Homarus americanus*, and the California spiny lobster, *Panulirus interruptus*, with comparative observations on the rock crab, *Cancer antennarius*" 1146

KRETSCH, M. J.—see CRAWFORD et al.

Kuhlia sandvicensis
feeding relationships on coral reefs in Kona, Hawaii 948

Kyphosus cinerascens
feeding relationships on coral reefs in Kona, Hawaii 964

La Jolla, California 295

"Laboratory study of behavioral interactions between the American lobster, *Homarus americanus*, and the California spiny lobster, *Panulirus interruptus*, with comparative observations on the rock crab, *Cancer antennarius*," by C. O'Neil Krekorian, David C. Sommerville, and Richard F. Ford 1146

Labroides phthirophagus
feeding relationships on coral reefs in Kona, Hawaii 989

LANDER, ROBERT H.—see WAHLE et al.

LANDERS, WARREN S.—see CABLE and LANDERS

Larvae
development and distribution of *Sebastolobus* 865
hard clam
temperature-time relationships for survival 1160
king crab
distribution and relative abundance in southeastern Bering Sea, 1969-70 804
lobster
dispersal into the East Pacific Barrier 639
plaice
rearing to metamorphosis using an artificial diet 353
silver hake
occurrence along middle Atlantic continental shelf during 1966 813
swimming energetics of anchovy 885

Larvae, fish—see Fish larvae

"Larval fishes of Yaquina Bay, Oregon: a nursery ground for marine fishes?" by William G. Pearcy and Sharon S. Myers 201

LASKER, REUBEN—see KITTREDGE et al.

LAWSON, KENNETH—see KANWISHER et al.

Leatherjacket
early development 435

LEIGHTON, DAVID L., "The influence of temperature on larval and juvenile growth in three species of southern California abalones" .. 1137

Leiostomus xanthurus—see Spot

LENARZ, WILLIAM H., "Length-weight relations for five eastern tropical Atlantic scombrids" 848

_____—see MATHER et al.

_____, W. W. FOX, JR., G. T. SAKAGAWA, and B. J. ROTHSCHILD, "An examination of the yield per recruit basis for a minimum size regulation for Atlantic yellowfin tuna, *Thunnus albacares*" 37

"Length-weight relations for five eastern tropical Atlantic scombrids," by William H. Lenarz 848

Lepomis macrochirus—see Bluegill

LIGHTNER, DONALD V., "Normal postmortem changes in the brown shrimp, *Penaeus aztecus*" 223

LILYBLADE, A. L.—see CRAWFORD et al.

LINDSEY, JAMES—see KITTREDGE et al.

"(A) link between science and management in fisheries," by D. H. Cushing 859

LINN, JAMES S.—see SMITH et al.

Linseed oil
effects on the flavor of turkey 1032

Lionfish
feeding relationships on coral reefs in Kona, Hawaii 944

Lipids
composition of residual in fish protein concentrates 845

Lizardfish
feeding relationships on coral reefs in Kona, Hawaii
Saurida gracilis 929
Synodus variegatus 929

Lizardfish, Red Sea
invasion into the Levant Basin
commercial fish populations as indicators of the biological effect 360
commercially important Red Sea migrants and their Mediterranean competitors 360
ecological barriers to migrating species 368
fishery statistics 360
food and habitat 364
growth 366
hake as a competitor of 367
human interference may facilitate invasion 369
invasion 364
meteorology 363
population explosion 369
Red Sea migrants as prey of 367
relation with relative species 366
relative importance 359
role of environmental factors 370
sea temperature 361
spawning 366

Lobster, American
laboratory study of behavioral interactions with the California spiny lobster 1146
tagged by Maine commercial fishermen, 1957-59 622

Lobster, California spiny
laboratory study of behavioral interactions with the American lobster 1146
the laboratory study of behavioral interactions with the rock crab 1146

Lobster larvae
dispersal into the East Pacific Barrier
cruise results 640
procedure 640

Long Island, New York 27

Lookdown
early development 431

Lyman—see Vessels

MacGREGOR, JOHN S., "Changes in the amount and proportions of DDT and its metabolities, DDE and DDD, in the marine environment off southern California, 1949-72" 275

Mackerel, chub
electrical threshold response of 851

Mackerel, frigate
length-weight relations for five eastern tropical Atlantic scombrids 848

McLAIN, DOUGLAS R.—see BAKUN et al.

Macrobenthic organisms
effects of dredging on populations of
changes in land usage patterns 458
chi-square analysis of number of species and specimens 462
comparison of standing crop with other areas 464
current velocity 451
dissolved nutrients 453
effects of wind-driven currents on sediment deposition 455
estimate of productivity of marsh 468
light penetration 450
mass movement of water 452
mechanical analysis of the sediment 454
Mercenaria survey 457
pH 450
population dynamics and distribution of organisms 465
previous dredging of Goose Creek 447
productivity 468
relationship of current velocity to characteristics of sediment and distribution of organisms 470
relationship of substratum to distribution of organisms 470
salinity 450
standing crop estimates 463
study area 445
water temperature 450

Macrocystis pyrifera—see Kelp, giant

Macropharyngodon geoffroy
feeding relationships on coral reefs in Kona, Hawaii 994

Marine ecosystems
effects of oil on
biodegradation 628
biological differences 628
biological effects 630
carcinogenicity 631
description of oil 626
environmental differences 627
hydrocarbons in marine food web 630
natural physical processes affecting oil in water column 627
observed toxic effects 631
oil in sediments 629
sublethal and chronic effects of oil pollution 634

MARTIN, A. DALE—see OLLA et al.

MATHER, F. J., III, B. J. ROTHSCHILD, G. J. PAULIK, and W. H. LENARZ, "Analysis of migrations and mortality of bluefin tuna, *Thunnus thynnus*, tagged in the northwestern Atlantic Ocean" 900

MAYO, FRANK V.—see BAKUN et al.

"(The) mean annual cycle of coastal upwelling off western North America as observed from surface measurements," by Andrew Bakun, Douglas R. McLain, and Frank V. Mayo 843

Melichthys niger
feeding relationships on coral reefs in Kona, Hawaii 1005

Menhaden, Gulf
early results from ERTS-1 experiment
analytical rationale and data limitations .. 378
commercial fishing data 378
ERTS-1 and aircraft environmental sensors 377
ERTS-1 imagery and fish distribution relationships 382
ERTS-1 imagery and oceanographic parameter relationships 385
experimental rationale 376
fisheries data 378
oceanographic parameter-fish distribution relationships 379
prediction models for resource management and utilization 385
sea-truth oceanographic parameter measurements 377
study area and fishery 376

"*Mercenaria mercenaria* (Mollusca: Bivalvia): temperature-time relationships for survival of embryos and larvae," by V. S. Kennedy, W. H. Roosenburg, M. Castagna, and J. A. Mihursky 1160

Mercenaria mercenaria—see Clam, hard

Merluccius bilinearis—see Hake, silver

Meteor—see Vessels

Micropogon undulatus—see Croaker, Atlantic

"Migrant gray whales with calves and sexual behavior of gray whales in the Monterey area of central California, 1967-73," by Alan Baldridge 615

MIHURSKY, J. A.—see KENNEDY et al.

MILLER, JOHN M., and BARBARA Y. SUMIDA, "Development of eggs and larvae of *Caranx mate* (Carangidae)" 497

MILLER, ROBERT VICTOR—see RICHARDS et al.

MINKLER, FREDERICK C.—see KEMMERER et al.

MISITANO, DAVID A.—see DURKIN and MISITANO

———, and CARL W. SIMS, "Unusual occurrence of an eastern banded killifish in the lower Columbia River" 855

MONCRIEF, ROBERT M.—see STRUHSAKER and MONCRIEF

Monognathus
metamorphic forms of 553
three new species
Monognathus ahlstromi 551
Monognathus isaacsi 548
Monognathus jesse 552

Monotaxis grandoculis
feeding relationships on coral reefs in Kona, Hawaii 956

Moorish idol
feeding relationships on coral reefs in Kona, Hawaii 1003

Morone saxatilis—see Bass, striped

MOSER, H. GEOFFREY, "Development and distribution of larvae and juveniles of *Sebastolobus* (Pisces; Family Scorpaenidae)" 865

———, and ELBERT H. AHLMSTROM, "Role of larval stages in systematic investigations of marine teleosts: the Myctophidae, a case study" 391

Mulloidichthys auriflamma
feeding relationships on coral reefs in Kona, Hawaii 957

Mulloidichthys samoensis
feeding relationships on coral reefs in Kona, Hawaii 957

MUSICK, JOHN A., "Seasonal distribution of sibling hakes, *Urophycis chuss* and *U. tenuis* (Pisces, Gadidae) in New England" 481

Mya arenaria—see Clam, soft-shell

Myctophidae
role of larval stages in systematic investigations
some evolutionary considerations 409
subfamily Lampanyctinae 403
subfamily Myctophinae 392

MYERS, SHARON S.—see PEARCY and MYERS

Myripristis amaenus
feeding relationships on coral reefs in Kona, Hawaii 940

Myripristis kuntee
feeding relationships on coral reefs in Kona, Hawaii 938

Myripristis murdjan
feeding relationships on coral reefs in Kona, Hawaii 939

Naso hexacanthus
feeding relationships on coral reefs in Kona, Hawaii 1001

Natal—see Vessels

Nematoscelis
International Indian Ocean Expedition collection, 1960-65
zoogeography of the genus 1039

Neomysis americana—see Shrimp, opossum

"Net filtering efficiency of a 3-meter Isaacs-Kidd Midwater Trawl," by A. L. Brooks, C. L. Brown, Jr., and P. H. Scully-Power 618

"(A) new model of ocean migrations of Bristol Bay sockeye salmon," by Robert R. French and Richard G. Bakkala 589

New York
Long Island 27

"Normal postmortem changes in the brown shrimp, *Penaeus aztecus*," by Donald V. Lightner 223

North America
coastal upwelling off western
mean annual cycle as observed from surface measurements 843

"Occurrence of a ratfish in the Columbia River estuary," by Joseph T. Durkin and David A. Misitano 854

"Occurrence of silver hake, *Merluccius bilinearis*, eggs and larvae along the middle Atlantic continental shelf during 1966," by Michael P. Fahay 813

Oil
effects of dietary α-tocopherol and tuna, safflower, and linseed oils on the flavor of turkey 1032

OLCOTT, H. S.—see CRAWFORD et al.

—————see SMITH et al.

Oligoplites saurus—see Leatherjacket

OLLA, BORI L., ALLEN J. BEJDA, and A. DALE MARTIN, "Daily activity, movements, feeding, and seasonal occurrence in the tautog, *Tautoga onitis*" 27

Omaka
development of eggs and larvae
body proportions 511
cultures 498
definitions, meristics, and morphometrics .. 499
egg development 499
growth 510
larvae fin development 507
larvae pigmentation 504
morphological development of yolk sac larvae 504
ossification 509
yolk sac larvae pigmentation 502

"On the dispersal of lobster larvae into the East Pacific Barrier (Decapoda, Palinuridea)," by Martin W. Johnson 639

Oncorhynchus kisutch—see Salmon, coho

Oncorhynchus nerka—see Salmon, sockeye

Opisthonema oglinum—see Herring, Atlantic thread

Oregon
Yaquina Bay 201

Oregon—see Vessels

Oshoro Maru—see Vessels

"Ostelogical development and variation in young tunas, genus *Thunnus* (Pisces, Scombridae), from the Atlantic Ocean," by Thomas Potthoff . 563

Ostracion meleagris
feeding relationships on coral reefs in Kona, Hawaii 1011

Pacific Ocean
variation of surface geostrophic flow data 1075
eastern boundary currents in the Northern Hemisphere 1079
North Equatorial Countercurrent 1080
North Equatorial Current region 1083
Peru Current 1078
South Equatorial Current region 1077
zoogeography of the genus *Nematoscelis* 1039

Panama City, Florida 181, 657

Pandalopsis dispar—see Shrimp, pandalid

Pandalus borealis—see Shrimp, pandalid

Pandalus goniurus—see Shrimp, pandalid

Pandalus hypsinotus—see Shrimp, pandalid

Pandalus jordani—see Shrimp, pandalid

Panulirus interruptus—see Lobster, California spiny

Paracirrhites arcatus
feeding relationships on coral reefs in Kona, Hawaii 986

Paracirrhites forsteri
feeding relationships on coral reefs in Kona, Hawaii 986

Paralithodes camtschatica—see Crab, king

PARK, TAISOO, "Calanoid copepods of the genus *Aetideus* from the Gulf of Mexico" 215

Parrotfish
feeding relationships on coral reefs in Kona, Hawaii
Scarus rubroviolaceus 996
Scarus sordidus 995
Scarus taeniurus 995

Parupeneus bifasciatus
feeding relationships on coral reefs in Kona, Hawaii 960

Parupeneus chryserydros
feeding relationships on coral reefs in Kona, Hawaii 962

Parupeneus multifasciatus
feeding relationships on coral reefs in Kona, Hawaii 958

Parupeneus porphyreus
feeding relationships on coral reefs in Kona, Hawaii 961

Patanela—see Vessels

PAULIK, G. J.—see MATHER et al.

PEARCY, WILLIAM G., and SHARON S. MYERS, "Larval fishes of Yaquina Bay, Oregon: a nursery ground for marine fishes?" 201

Pelican—see Vessels

Penaeus aztecus—see Shrimp, brown

Pervagor spilosoma
feeding relationships on coral reefs in Kona, Hawaii 1010

PETERSON, D. W.—see CRAWFORD et al.

Phoca vitulina richardi—see Seal, harbor

Pillsbury—see Vessels

Pioneer—see Vessels

Plagiotremus goslinei
feeding relationships on coral reefs in Kona, Hawaii 999

Plaice
rearing of larvae to metamorphosis using an artificial diet 353

Plectroglyphidodon johnstonianus
feeding relationships on coral reefs in Kona, Hawaii 978

Pleurobrachia bachei
quantitative natural history
demography and net production 325
growth in culture and metabolic rates 297
physical parameters and distribution 304
seasonal variations in parasites, predators, and prey 313
significance of, in plankton 332
study area 300

Pleuronectes platessa—see Plaice

Pomacentrus jenkinsi
feeding relationships on coral reefs in Kona, Hawaii 979

Pontellina
systematics and distribution of sibling species
abundance 106
developmental stages and breeding 86
geographical distribution 111
geographical variation and sympatry 103
measurements 64
phylogenetic relationships 93
Pontellina morii sp. n. 79
Pontellina platychela sp. n. 75
Pontellina plumata (Dana) 71
Pontellina sobrina sp. n. 84
sample analysis 64
seasonal occurrence and breeding 93
specimen analysis 64
vertical distribution 105

Porgy
feeding relationships on coral reefs in Kona, Hawaii
Monotaxis grandoculis 956

Porgy, longspine
electrical threshold response of 851

PORTER, RUSSEL G., "Reproductive cycle of the soft-shell clam, *Mya arenaria*, at Skagit Bay, Washington" 648

POTTHOFF, THOMAS, "Osteological development and variation in young tunas, genus *Thunnus* (Pisces, Scombridae), from the Atlantic Ocean" 563

POWELL, GUY C., KENNETH E. JAMES, and CHARLES L. HURD, "Ability of male king crab, *Paralithodes camtschatica*, to mate repeatedly, Kodiak, Alaska, 1973" 171

Pranesus insularum
feeding relationships on coral reefs in Kona, Hawaii 931

Priacanthus cruentatus—see Bigeye

Prince—see Vessels

Pseudocheilinus octotaenia
feeding relationships on coral reefs in Kona, Hawaii 989

Pterios sphex—see Lionfish

Puffer, sharpbacked
feeding relationships on coral reefs in Kona, Hawaii
Canthigaster amboinensis 1013
Canthigaster jactator 1014

Puffer, spiny
feeding relationships on coral reefs in Kona, Hawaii
Diodon holocanthus 1015
Diodon hystrix 1015

"Quantitative natural history of *Pleurobrachia bachei* in La Jolla Bight," by Jed Hirota 295

QUAST, JAY C., "Density distribution of juvenile Arctic cod, *Boreogadus saida*, in the eastern Chukchi Sea in the fall of 1970" 1094

RAJU, SOLOMON N., "Three new species of the genus *Monognathus* and the leptocephali of the order Saccopharyngiformes" 547

Ratfish
occurrence in the Columbia River estuary ... 854

"Rearing of plaice *(Pleuronectes platessa)* larvae to metamorphosis using an artificial diet," by J. W. Adron, A. Blair, and C. B. Cowey 353

REESE, GLADYS B.—see KEMMERER et al.

"Reproductive cycle of the soft-shell clam, *Mya arenaria*, at Skagit Bay, Washington," by Russell G. Porter 648

"(The) residual lipids of fish protein concentrates," by Vega J. Smith, James S. Linn, and Harold S. Olcott 845

Rhinecanthus rectangulus
feeding relationships on coral reefs in Kona, Hawaii 1006

RICE, STANLEY D.—see EVANS and RICE

RICHARDS, WILLIAM J.—see HOUDE et al.

_____, ROBERT VICTOR MILLER, and EDWARD D. HOUDE, "Egg and larval development of the Atlantic thread herring, *Opisthonema oglinum*" 1123

Rockaway—see Vessels

"Role of larval stages in systematic investigations of marine teleosts: the Myctophidae, a case study," by H. Geoffrey Moser and Elbert H. Ahlstrom 391

ROOSENBURG, W. H.—see KENNEDY et al.

ROSENTHAL, RICHARD J., WILLIAM D. CLARKE, and PAUL K. DAYTON, "Ecology and natural history of a stand of giant kelp, *Macrocystis pyrifera*, off Del Mar, California" .. 670

ROTHSCHILD, B. J.—see LENARZ et al.

_____—see MATHER et al.

Rudderfish, banded
early development 422

Runner, rainbow
early development 417

RUSSELL, GARY M.—see WICKHAM and RUSSELL

Saccopharyngiformes
leptocephali of
affinities of Saccopharyngoidei within the Anguilliformes 560
Leptocephalus latissimus 555
Leptocephalus pseudolatissimus 557
metamorphic form of *Eurypharynx pelecanoides* 558
metamorphic form of *Saccopharynx* 557

Safflower oil
effects on the flavor of turkey 1032

SAKAGAWA, G. T.—see LENARZ et al.

SAKSENA, VISHNU P.—see HOUDE et al.

Salmon, coho
bioeconomic contribution of Columbia River hatchery
economic evaluation 152
estimation of total catch from hatcheries .. 145
experimental design 140
field operations 144

Salmon, sockeye
new model of ocean migrations of Bristol Bay
distribution and migration inferred from high-seas catches 592
distribution as determined by coastal tag returns 590
influence of water areas and currents 609
model 610

Sardine, scaled
description of eggs and larvae
comparisons 1120
description and occurrence of embryos 1107
description of larvae 1108
meristics 1110
morphometrics 1107
osteological development 1112
pigmentation 1116
scales 1112
transformation 1120
electrical threshold response of 851

Saurida gracilis
feeding relationships on coral reefs in Kona, Hawaii 929

Saurida undosquamis—see Lizardfish, Red Sea

Saury, Pacific
northeastern Pacific Ocean
availability of fishable concentrations 128
growth 126
length-weight relation 126
mortality 128
status of knowledge 121
stock composition 123

Scad, round
early development 426

Scarus rubroviolaceus
feeding relationships on coral reefs in Kona, Hawaii 996

Scarus sordidus
feeding relationships on coral reefs in Kona, Hawaii 995

Scarus taeniurus
feeding relationships on coral reefs in Kona, Hawaii 995

Scomber japonicus—see Mackerel, chub

Scombrids
length-weight relations for five eastern tropical Atlantic
bigeye tuna 848
frigate mackerel 848
little tunny 848
skipjack tuna 848
yellowfin tuna 848

Scophthalmus aquosus—see Windowpane

Scorpaena coniorta
feeding relationships on coral reefs in Kona, Hawaii 945

Scorpaenopsis cacopsis
feeding relationships on coral reefs in Kona, Hawaii 946

Scorpionfish
feeding relationships on coral reefs in Kona, Hawaii
lionfish 944
Scorpaena coniorta 945
Scorpaenopsis cacopsis 946

SCULLY-POWER, P. H.—see BROOKS et al.

Sea bass
feeding relationships on coral reefs in Kona, Hawaii
Cephalopholis argus 947

Sea chub
feeding relationships on coral reefs in Kona, Hawaii
Kyphosus cinerascens 964

Seal, fur
heavy metals in
age determinations 135
analyses of samples 134
collection of samples 134
heavy metal-age comparison 136
tissues 135

Seal, harbor
heavy metals in
age determinations 135
analyses of samples 134
collection of samples 134
heavy metal-age comparison 136
mercury in livers 136
tissues 135

"Seasonal distribution of sibling hakes, *Urophycis chuss* and *U. tenuis* (Pisces, Gadidae) in New England," by John A. Musick 481

Sebastolobus
development and distribution of larvae and juveniles
distinguishing features 871
distribution 880
fin development 876
general morphology 871
pigmentation 879

SEIDEL, WILBER R., and EDWARD F. KLIMA, "In situ experiments with coastal pelagic fishes to establish design criteria for electrical fish harvesting systems" 657

Selene vomer—see Lookdown

Seriola zonata—see Rudderfish, banded

Shrimp, brown
normal postmortem changes
antennal gland 232
gills 231
gonadal tissue 232
gross observations 224
heart and major vessels 229
histological observations 225
integument 229
musculature 229
nerve tissue 232

Shrimp, opossum
distribution, variation, and supplemental description
distribution 841
morphological analysis 836
supplemental description 838

Shrimp, pandalid
electrophoretic comparison of five species from the northeastern Pacific Ocean
Pandalopsis dispar 799
Pandalus borealis 799
Pandalus goniurus 799
Pandalus hypsinotus 799
Pandalus jordani 799

Silas Bent—see Vessels

Silver Bay—see Vessels

Silversides
feeding relationships on coral reefs in Kona, Hawaii
Pranesus insularum 931

"(A) simple bioeconomic fishery management model: a case study of the American lobster fishery," by Richard F. Fullenbaum and Frederick W. Bell 13

SIMS, CARL W.—see MISITANO and SIMS

Siphonophores
distribution adjacent to Suez and Panama canals

Abyla carina 544
Abyla haeckeli 544
Abyla schmidt 544
Abylopsis eschscholtzi 542
Abylopsis tetragona 542
Agalma elegans 542
Agalma okeni 542
Amphicaryon acaule 542
Amphicaryon ernesti 542
Anthophysa rosea 542
Apolemia uvaria 542
Athoribya rosacea 542
Bassia bassensis 542
Ceratocymba dentata 544
Ceratocymba leuckarti 544
Ceratocymba sagittata 542
Chelophyes appendiculata 541
Chelophyes contorta 541
Clausophyes ovata 541
Cordagalma cordiformis 542
Dimophyes arctica 543
Diphyes bojani 541
Diphyes chamissonis 541
Diphyes dispar 541
Diphyopsis mitra 541
distribution in eastern Mediterranean and Red Sea 529
distribution in western Caribbean and central American Pacific 534
Enneagonum hyalinum 542
Eudoxia russelli 541
Eudoxoides spiralis 541
Forskalia edwardsi 542
Hippopodius hippopus 542
Lensia campanella 541
Lensia challengeri 543
Lensia conoidea 541
Lensia cossack 543
Lensia fowleri 541
Lensia hotspur 541
Lensia lelouveteau 543
Lensia meteori 541
Lensia multicristata 541
Lensia subtilis 541
Lensia subtiloides 541
Melophysa melo 544
Muggiaea atlantica 541
Muggiaea kochi 541
Nanomia cara 542
Nectopyramis natans 544
Physophora hydrostatica 542
Praya cymbiformis 542
Rhizophysa filiformis 542
Rosacea plicata 542
Sphaeronectes spp. 541
Stephanomia bijuga 542
Stephanomia rubra 542
Sulculeolaria angusta 541
Sulculeolaria bigelowi 543
Sulculeolaria biloba 541
Sulculeolaria chuni 542
Sulculeolaria monoica 544
Sulculeolaria quadrivalvis 542
Sulculeolaria turgida 542
Vogtia glabra 542
Vogtia pentacantha 542
Vogtia spinosa 542

Skagit Bay, Washington 648

SMITH, VEGA J., JAMES S. LINN, and HAROLD S. OLCOTT, "The residual lipids of fish protein concentrates" 845

Snapper
feeding relationships on coral reefs in Kona, Hawaii
Aphareus furcatus 955

Solimoés—see Vessels

"Some aspects of the ecology of stomiatoid fishes in the Pacific Ocean near Hawaii," by Thomas A. Clarke 337

"Some effects of dredging on populations of macrobenthic organisms," by Eugene H. Kaplan, J. R. Welker, and M. Gayle Kraus 445

SOMMERVILLE, DAVID C.—see KREKORIAN et al.

SOUTAR, ANDREW, and JOHN D. ISAACS, "Abundance of pelagic fish during the 19th and 20th centuries as recorded in anaerobic sediment off the Californias" 257

Spisula solidissima—see Clam, surf

Spot
electrical threshold response of 851

Squirrelfish
feeding relationships on coral reefs in Kona, Hawaii
Holocentrus diadema 934
Holocentrus lacteoguttatum 937
Holocentrus sammara 932
Holocentrus spinifera 932
Holocentrus tiere 934
Holocentrus xantherythrus 934
Holotrachys lima 938
Myripristis amaenus 940
Myripristis kuntee 938
Myripristis murdjan 939

Stenotomus caprinus—see Porgy, longspine

Stethojulis balteata
feeding relationships on coral reefs in Kona, Hawaii 992

STICKNEY, ROBERT R., GARY L. TAYLOR, and RICHARD W. HEARD III, "Food habits of Georgia estuarine fishes. I. Four species of flounders (Pleuronectiformes: Bothidae)" 515

"Stock composition, growth, mortality, and availability of Pacific saury, *Cololabis saira*, of the northeastern Pacific Ocean," by Steven E. Hughes 121

Stranger—see Vessels

STRUHSAKER, PAUL, and ROBERT M. MONCRIEF, "*Bothus thompsoni* (Fowler) 1923, a valid species of flatfish (Pisces: Bothidae) from the Hawaiian Islands" 237

Sufflamen bursa
feeding relationships on coral reefs in Kona, Hawaii 1008

SUMIDA, BARBARA Y.—see MILLER and SUMIDA

"Summary of selected early results from the ERTS-1 menhaden experiment," by Andrew J. Kemmerer, Joseph A. Benigno, Gladys B. Reese, and Frederick C. Minkler 375

SUNDNES, GUNNAR—see KANWISHER et al.

Surgeonfish
feeding relationships on coral reefs in Kona, Hawaii
Acanthurus thompsoni 1000
Naso hexacanthus 1001

Suriname Rivier—see Vessels

"(The) swimming crabs of the genus *Callinectes* (Decapoda: Portunidae)," by Austin B. Williams 685

"Swimming energetics of the larval anchovy, *Engraulis mordax*," by W. J. Vlymen 885

Synodus variegatus
feeding relationships on coral reefs in Kona, Hawaii 929

"Systematics and distribution of the four sibling species comprising the genus *Pontellina* Dana (Copepoda, Calanoida)," by A. Fleminger and K. Hulsemann 63

TAKAHASHI, FRANCIS T.—see KITTREDGE et al.

Talisman—see Vessels

Tautog
Long Island, New York
activity and movements 29
feeding 31
seasonal movements 33

Tautoga onitis—see Tautog

TAYLOR, GARY L.—see STICKNEY et al.

Telemetry
acoustic, from fish
behavior 254
depth transmitter 252
heartbeat transmitters 252
physiological response 254
receiver 253
sound as telemetry medium 251

Teritu—see Vessels

Thalassoma duperrey
feeding relationships on coral reefs in Kona, Hawaii 990

Thalassoma fuscus
feeding relationships on coral reefs in Kona, Hawaii 991

"Thermoregulatory behavior and diel activity patterns of bluegill, *Lepomis macrochirus*, following thermal shock," by Thomas L. Beitinger 1087

"Three new species of the genus *Monognathus* and the leptocephali of the order Saccopharyngiformes," by Solomon N. Raju 547

Thunnus albacares—see Tuna, yellowfin

Thunnus obesus—see Tuna, bigeye

Thunnus thynnus—see Tuna, bluefin

Torrey Canyon—see Vessels

Trawl—see Isaacs-Kidd Midwater Trawl

Triggerfish
feeding relationships on coral reefs in Kona, Hawaii
Melichthys niger 1005
Rhinecanthus rectangulus 1006
Sufflamen bursa 1008
Xanthichthys ringens 1006

Trumpetfish
feeding relationships on coral reefs in Kona, Hawaii
Aulostomus chinensis 942

TSUCHIYA, MIZUKI, "Variation of the surface geostrophic flow in the eastern intertropical Pacific Ocean" 1075

Tuna
osteological development and variation in young from Atlantic Ocean
bones and rakers of the first gill arch 578
fins and fin supports 572
identification 584
lateral line scales 583
vertebral column 564

Tuna, bigeye
length-weight relations for five eastern tropical Atlantic scombrids 848

Tuna, bluefin
analysis of migrations and mortality of tagged
estimates of fishing and other losses 909
method of release 905
migrations 900
total mortality estimates—Chapman and Robson method 906
total mortality estimates—regression method 911

Tuna, little tunny
length-weight relations for five eastern tropical Atlantic scombrids 848

Tuna, skipjack
length-weight relations for five eastern tropical Atlantic scombrids 848

Tuna, yellowfin
examination of yield per recruit basis for minimum size regulation for
approaches to yield-per-recruit analysis 39
computer programs 40
data 39
definitions of minimum size 38
dispersion of gear and yield per recruit 58
interaction between minimum size and catch quota regulations 58
knife-edged recruitment approach 41
parameters 40
relation between fleet composition and optimum size at recruitment 57
size-specific F approach 45
length-weight relations for five eastern tropical Atlantic scombrids 848

Tuna oil
effects on the flavor of turkey 1032

Ulua, blue
feeding relationships on coral reefs in Kona, Hawaii 954

Umitaka Maru—see Vessels

Undaunted—see Vessels

"Unusual occurrence of an eastern banded killifish in the lower Columbia River," by David A. Misitano and Carl W. Sims 855

Upwelling—see Coastal upwelling

Urophycis chuss—see Hake, red

Urophycis tenuis—see Hake, white

UTTER, FRED M.—see JOHNSON et al.

"Variatioan of the surface geostrophic flow in the eastern intertropical Pacific Ocean," by Mizuki Tsuchiya 1075

Varuna—see Vessels

Velero—see Vessels

Velero III—see Vessels

Vessels
Alaminos 1076
Alaska 66
Albatross 749
Albatross IV 482
Arcturus 750
Argo 66, 1042, 1076
Argosy 756
Arrow 625
Askoy 756
Atlantis 749
Atlantis II 66, 1043
Silas Bent 66
Blake 729
Blue Goose 743
George M. Bowers 660, 733
Anton Bruun 66
Calypso 729
Cameron 482
Cape St. Mary 744
Chain 66, 1043
John N. Cobb 130
Combat 733
Coquette 743
Townsend Cromwell 66, 237, 350, 640
Delaware 66, 1043
Diamantina 66
Discovery 67
Dolphin 814
Dorsetshire 744
Emilia 746
Ensign 734
Fish Hawk 749
Freelance 742
Frobisher 744
Gascoyne 66
Theodore N. Gill 66, 835
Glacier 1105
Gulf Ranger 182
Hassler 729
Horizon 66
Hunt 66
Islander VI 67
David Starr Jordan 66, 640, 1076
Kagoshima Maru 67
Kistna 67, 1042
Koyo Maru 67, 1047
Lyman 786
Meteor 67
Natal 67, 1042
Oregon 66, 727
Oshoro Maru 67
Patanela 1042
Pelican 733
Pillsbury 730
Pioneer 67

Prince 482
Rockaway 66, 1076
Silver Bay 733
Solimoès 746
Stranger 66
Suriname Rivier 746
Talisman 729
Teritu 350
Torrey Canyon 625
Umitaka Maru 67
Undaunted 1076
Varuna 67
Velero 787
Velero III 728
Vidal 729
Vitiaz 67
Thomas Washington 66, 528, 1076
Zaca 756

Vidal—see Vessels

Vitiaz—see Vessels

VLYMEN, W. J., "Swimming energetics of the larval anchovy, *Engraulis mordax*" 885

VREELAND, ROBERT R.—see WAHLE et al.

WAHLE, ROY J., ROBERT R. VREELAND, and ROBERT H. LANDER, "Bioeconomic contribution of Columbia River hatchery coho salmon, 1965 and 1966 broods, to the Pacific salmon fisheries" 139

Washington
  Skagit Bay 648

Thomas Washington—see Vessels

WELKER, J. R.—see KAPLAN et al.

Whale, gray
  migrants with calves and sexual behavior off central California
    northward migration 615
    sexual behavior 616

Whiff, bay
  Georgia
    food habits of 522

WICKHAM, DONALD A., and GARY M. RUSSELL, "An evaluation of mid-water artificial structures for attracting coastal pelagic fishes" . 181

WILLIAMS, AUSTIN B., "The swimming crabs of the genus *Callinectes* (Decapoda: Portunidae)" 685

———, THOMAS E. BOWMAN, and DAVID M. DAMKAER, "Distribution, variation, and supplemental description of the opossum shrimp, *Neomysis americana* (Crustacea: Mysidacea)" 835

Windowpane
  Georgia
    food habits of 523

Wrasse
  feeding relationships on coral reefs in Kona, Hawaii
    Anampses cuvier 992
    bird 994
    Bodianus bilunulatus 989
    Cheilinus rhodochrous 989
    Coris gaimard 993
    Halichoères ornatissimus 991
    Labroides phthirophagus 989
    Macropharyngodon geoffroy 994
    Pseudocheilinus octotaenia 989
    Stethojulis balteata 992
    Thalassoma duperrey 990
    Thalassoma fuscus 991

Xanthichthys ringens
  feeding relationships on coral reefs in Kona, Hawaii 1006

Yaquina Bay, Oregon
  larval fishes of
    description of estuary 201
    estuary as a nursery 208
    horizontal variations 205
    relative abundances of larvae 203
    sampling methods 202
    seasonal variations 204
    species composition 203
    tidal-diel variations 208

Zaca—see Vessels

Zanclus canescens—see Moorish idol

"Zoogeography of the genus *Nematoscelis* (Crustacea, Euphasiacea)," by K. Gopalakrishnan .. 1039